

What is claimed is:

1. A device comprising:

a microstrip network, disposed on a ground plane, comprising at least one collection point, where said at least one collection point is in electrical communication with said microstrip network;

a probe associated with each of said at least one collection points, said probe extending through at least one opening in said ground plane and in electrical communication with at least one first transmission line; and,

a first physical perturbation associated with said probe, said first physical perturbation integrated with said at least one first transmission line to create a first signal port in the at least one first transmission line and a second signal port in said at least one first transmission line.

2. The device of claim 1, where the first physical perturbation includes at least one of: a post, a cylinder, a ridge, a cleft, an iris, and a transmission line width.

3. The device of claim 1, where the first physical perturbation is based on at least one of: a characteristic impedance of the at least one first transmission line, and a desired directivity of signals propagating along the at least one first transmission line.

4. The device of claim 1, where at least one physical characteristic of the first physical perturbation is selected based on at least one of: a characteristic impedance of the first at least one transmission line, and a desired directivity of signals propagating along the at least one first transmission line.

5. The device of claim 4, where the at least one physical characteristic includes at least one of: a shape, a size, a width, a physical dimension, a position, a distance from the associated probe, a physical association with the at least one first transmission line, and a physical association to the at least one first transmission line.

6. The device of claim 1, where the at least one collection point is capable of at least one of: receiving energy from the microstrip network, and delivering energy to the microstrip network.

7. The device of claim 1, where the probe is capable of at least one of: delivering energy to the at least one first transmission line, and receiving energy from the at least one first transmission line.
8. The device of claim 1, where the probe, the first port, and the second port are associated with a three port signal coupler provided by the first physical perturbation.
9. The device of claim 1, where each of the at least one collection points communicate one of: right-hand circularly polarized energy or left-hand circularly polarized energy.
10. The device of claim 9, where the at least one first transmission line includes at least one of: at least one transmission line for right-hand circularly polarized energy and at least one transmission line for left-hand circularly polarized energy.
11. The device of claim 1, where said at least one first transmission line includes a rectangular waveguide channel.
12. The device of claim 1, where said microstrip network comprises microstrip patch elements.
13. The device of claim 12, where said microstrip patch elements comprise driven patch elements.
14. The device of claim 12, where said microstrip patch elements are at least one of coupled with and connected to at least one second transmission line.
15. The device of claim 13, where said microstrip network comprises six or eight driven patch elements associated with said at least one common collection point.
16. The device of claim 15, where said driven patch elements are connected with said at least one common collection point by at least one second transmission line, said at least one second transmission line integrated with a second physical perturbation.
17. The device of claim 16, where said second physical perturbation is a linewidth change in said at least one second transmission line.

18. The device of claim 13, where said microstrip network is an array of said driven patch elements.

19. The device of claim 1, where said probe further comprises at least one of a spacer element and an insulating element.

20. The device of claim 19, where said spacer element comprises a fluoropolymer.

21. An antenna comprising:

a microstrip network disposed on a ground plane, comprising at least one collection point, where said at least one collection point is in electrical communication with said microstrip network;

a first waveguide assembly; and

a probe associated with each of said at least one collection points, said probe extending through at least one opening in said ground plane to said first waveguide assembly, where said first waveguide assembly comprises at least one physical perturbation, the at least one physical perturbation associated with said probe and integrated with said first waveguide assembly to create a first signal port in said first waveguide assembly and a second signal port in said first waveguide assembly.

22. The antenna of claim 21, where said first waveguide assembly comprises a first waveguide channel for communicating substantially left hand circularly polarized signals.

23. The antenna of claim 22, where said first waveguide assembly further comprises a second waveguide channel for communicating substantially right hand circularly polarized signals.

24. The antenna of claim 23, where said first and second waveguide channels are independently electrically isolated.

25. The antenna of claim 24, where said first and second waveguide channels are separated by a waveguide wall comprising a recess.

26. The device of claim 25, where said recess is substantially filled with a composition comprising a conductive epoxy resin.
27. The antenna of claim 21, where said microstrip network comprises a two dimensional array of microstrip patch elements and collection points.
28. The antenna of claim 27, where at least one of a row and a column of said collection points is physically aligned with said first waveguide channel.
29. The antenna of claim 21, where said physical perturbation includes at least one of: a post, a cylinder, a ridge, a cleft, an iris, and a waveguide width.
30. The antenna of claim 21, where location of said physical perturbation is based on a width of said first waveguide channel.
31. The antenna of claim 21, further comprising a second waveguide assembly in electrical communication with the first waveguide assembly.
32. The antenna of claim 31, further comprising a first signal junction to communicate signals between said first waveguide assembly and said second waveguide assembly.
33. The antenna of claim 32, where said second waveguide assembly is substantially fan-shaped.
34. The antenna of claim 33, where said second waveguide assembly includes varying length waveguide channels.
35. The antenna of claim 34, where the varying length waveguide channels introduce at least one time delay to compensate for antenna tilt.
36. The antenna of claim 33, where said second waveguide assembly comprises a second signal junction.
37. The antenna of claim 36, where said second junction communicates signals between the second waveguide assembly and a third transmission line.

38. The antenna of claim 31, where said second waveguide assembly includes at least one physical perturbation.

39. The antenna of claim 21, where said probe produces an amplitude taper in a signal.